

**REMARKS/ARGUMENTS**

Claims 11-17 are pending. It is clear from the specification that the present invention comprises an echelle structure and method for fabricating such a structure to provide a unique grating surface to achieve some desired transfer function. Reflective facets are provided with different widths to effect amplitude variations and are spaced from one another non-periodically to accommodate phase variations (see pages 12 and 13, paragraphs 0034 and 0036). Thus, the terminology “reflective facet portions selectively disposed in non-constant period arrangement” is supported by the description as is the phrase “unequal in spacing and width dimension”. In regard to the term “single mode” see the term used in paragraph 0030 and in original claims 5 and 8 as a well-known term of the optical fiber art. In regard to the specific questions recited in paragraph 9 of the Office Action, Applicant responds as follows:

- 1) The term “non-constant period arrangement” refers to variations in distance between reflective facets wherein unlike prior art structures that distance is not constant.
- 2) The term “v represents frequency in Hz” refers to the transfer function being presented in the frequency domain as a function of frequency.
- (3) Amplitude and phase are measures of the components of the transfer function (i.e., the Fourier transform of the impulse response) which are achieved physically by size (width) and relative positions (spacing) of the reflective surfaces (facets) of the echelle.
- (4) See (3).
- (5) An optical fiber is effectively a mode filter if it will support only a single mode.
- (6) Applicant has amended herein to refer to “facets” only and not to “facet portions”.
- (7) Applicant has amended. The purpose was to indicate that one could use this device to realize any optical transfer function by selecting certain unequal facet spacing and unequal facet widths for that transfer function.

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(8) See paragraphs 0035, 0037 and 0038 in regard to sampling interval T. The term is believed to be well-known to those of ordinary skill in the art of transforms and transfer functions.

(9) The equation in claim 13 is only one element of the method which has physical limitations in terms of widths and positions of facets.

(10, 11) These terms are believed to be clear to those of ordinary skill in the art of transfer functions and transforms and overall in claim 13 there are adequate physical relationships to physical structure as noted above.

(12) Amended.

(13) Need not specify what coating is since increasing reflectively by coating is well-known in the optical arts.

(14) Amended.

(15) Amended.

Objection to the Drawings

The drawings already show “means of collimating” (see lenses 2 and 4 in FIG. 6). Claim 18 is being cancelled herein to make the slab waveguide issue moot.

Prior Art

Hetrick's invention uses an echelle grating with some focusing, for the purpose of reducing the (Airy) transfer function of a spectrometer (monochromator) to the diffraction limit, with a minimal of components. Hetrick achieves this by minimizing geometric errors for a single image point – specifically, minimizing spherical aberration, defocus and coma. This is the essence of his invention.

Hetrick does not, however, describe how one can arbitrarily modify the groove structure to achieve an arbitrary (non-Airy) transfer function, which is claimed for the present invention. In fact, if he were to do so, he would violate his own invention, because he cannot, even in principle, reduce to zero this combination of aberrations for an arbitrarily perturbed grating period, since this introduces aberrations well beyond 3rd order (in fact, for the examples in the application, the aberrations could be classified as 128th order).

Thus, Hetrick's invention is not an application of the present invention. It applies only to the narrow field of a spectrometer. While a spectrometer can be viewed as a very narrow application of the present invention, it does not encompass it.

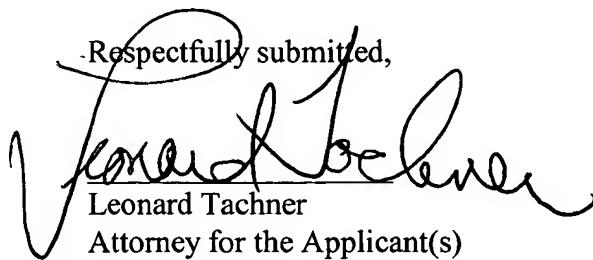
Once again, Hetrick's invention is not like the present invention. Although it obviously shares some of the components, Hetrick does not teach how to perturb the echelle structure to conform to any arbitrary transfer function (or, equivalently, an arbitrary impulse response). Sappey et al's invention also describes a device with similar components in it, but the inventors do not teach how to modify the grating structure for the purpose of achieving an arbitrary transfer function to any of the output fibers. Thus, it too is not an example of everything like the present invention.

Hetrick and Sappey et al do not teach how to modify the grating structure for the purpose of achieving an arbitrary impulse response.

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Claims 11-17 are therefore clearly patentable over the art of record and an early allowance is respectfully solicited. In any event, Applicant respectfully requests entry of the present amendment to at least place the application in better condition for appeal.

Respectfully submitted,

  
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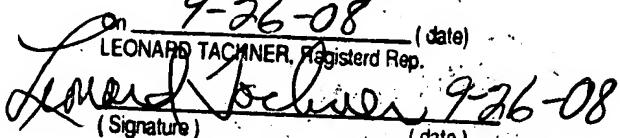
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